

CLAIMS

1. A transmission target X-ray tube comprising, a cathode arranged to provide a source of electrons, an anode held at a positive potential with respect to the cathode and arranged to accelerate electrons from the cathode such that they will impact on the anode thereby to produce X-rays, wherein the anode is a thin film anode, and a retardation electrode held at a negative potential with respect to the anode thereby to produce an electric field between the anode and the retardation electrode which can slow down electrons which have passed through the anode thereby reducing the amount of heat they can generate in the tube, wherein the retardation electrode is located on the opposite side of the anode to the cathode.
2. A transmission target X-ray tube according to claim 1 wherein the retardation electrode is held at a positive potential with respect to the cathode.
3. A transmission target X-ray tube according to claim 1 or claim 2 wherein the retardation electrode is made of an electrically conducting material.
4. A transmission target X-ray tube according to any foregoing claim wherein the retardation electrode forms part of an electrical circuit so that electrons collected by the retardation electrode can be conducted away from it thereby maintaining its potential substantially constant.
5. A transmission target X-ray tube according to claim 4 wherein the retardation electrode is electrically connected to the anode via a resistor so that current flowing through the resistor will determine the potential of the retardation electrode with respect to the anode.

6. A transmission target X-ray tube according to any foregoing claim including a housing enclosing the anode and the cathode, wherein at least a part of the housing forms the retardation electrode.
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7. A transmission target X-ray tube according to any of claims 1 to 5 further comprising a housing, wherein the retardation electrode is located between the anode and the housing thereby to slow down electrons before they reach the housing.
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8. A transmission target X-ray tube according to any foregoing claim wherein the anode is supported on a backing layer of lower atomic number than the anode.
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9. A transmission target X-ray tube according to any foregoing claim wherein the anode has a thickness of the order of 5 microns or less.
10. A transmission target X-ray tube according to any foregoing claim which defines a window through which X-rays are to be emitted, wherein the retardation electrode extends between the anode and the window so that X-rays passing out through the window will pass through the retardation electrode.
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11. A transmission target X-ray tube according to claim 10 wherein the anode is arranged to produce X-rays having a range of energies including a peak energy, and the retardation electrode has an X-ray attenuation which varies with X-ray energy and has a minimum value around a minimum attenuation energy, and wherein the retardation electrode material is selected such that the minimum attenuation energy coincides with the peak energy.
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12. A transmission target X-ray tube substantially as hereinbefore described with reference to Figures 1, 1a and 1b, Figure 2, Figure 3 or Figure 4 of the accompanying drawings.